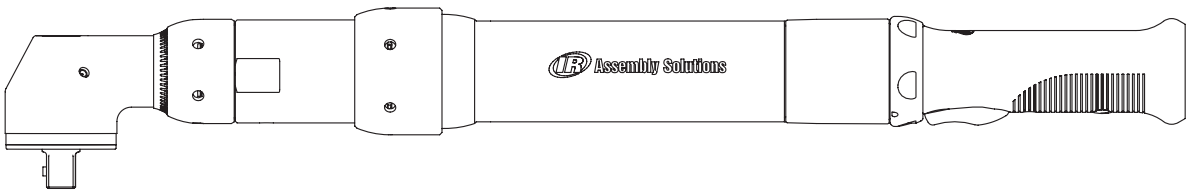
Form P7775
Edition 1
April, 2004
CCN 04580973

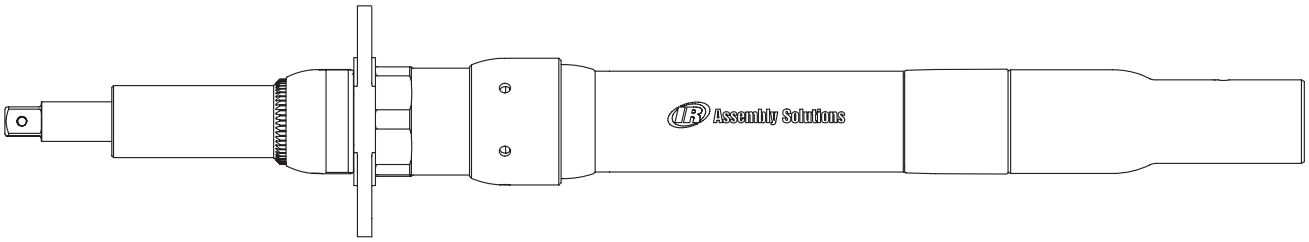
Service Manual for
QE8 Series High Torque
Angle Wrench and **In-Line** DC Electric Tools

NOTICE

For routine Maintenance, Operation and Instruction information regarding this product, see Publication manual P7609, located at *www.irtools.com/techdocuments*, or contact the nearest Ingersoll-Rand Office or Distributor.



(Dwg. TP2160a)

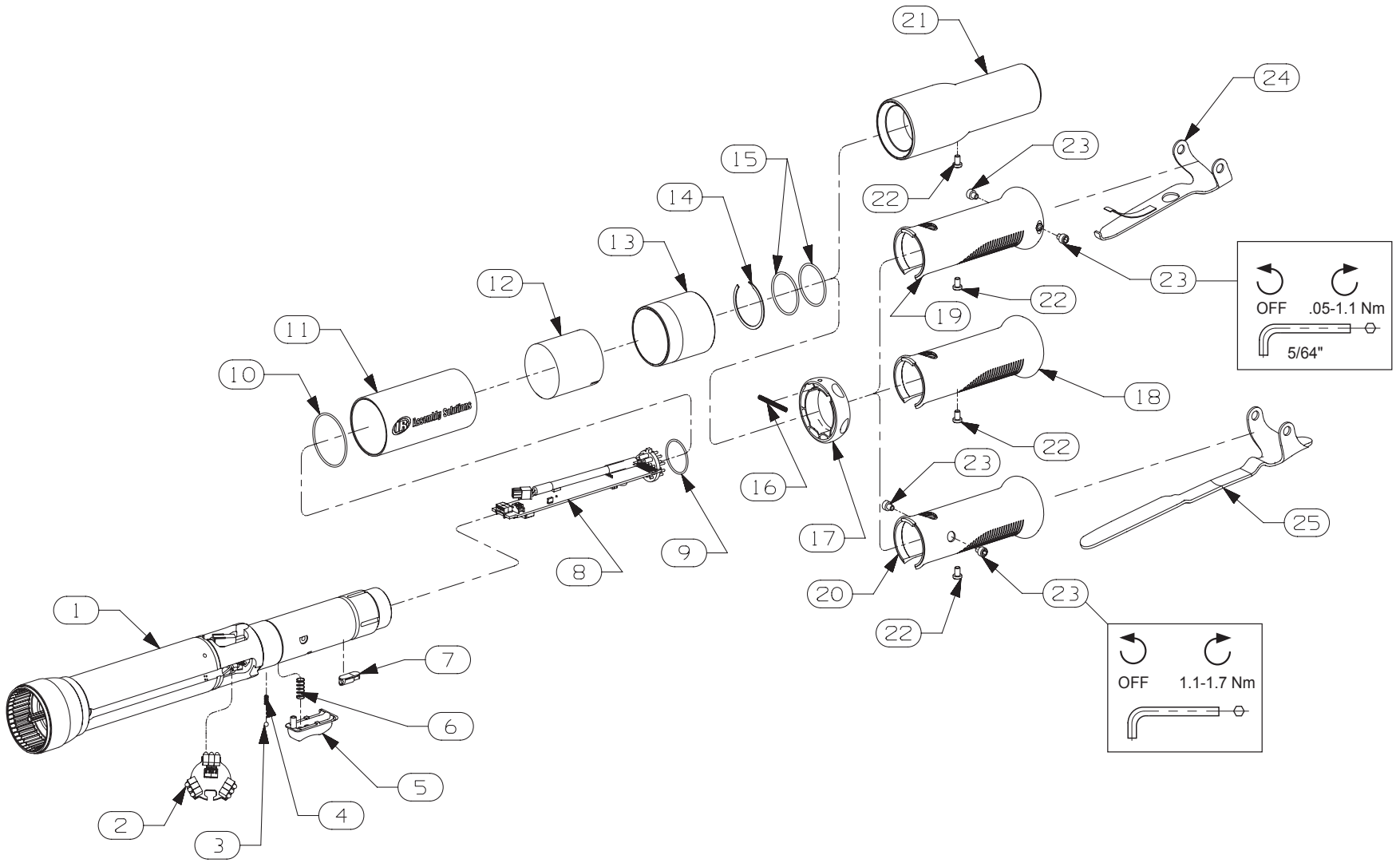


(Dwg. TP2160b)

Refer All Communications to the Nearest Ingersoll-Rand Office or Distributor.
© Ingersoll-Rand Company 2004
Printed in U.S.A

Assembly Solutions

QE8 HIGH TORQUE MOTOR HOUSING ASSEMBLY, GRIPS AND LEVERS



(Dwg. TP2155)

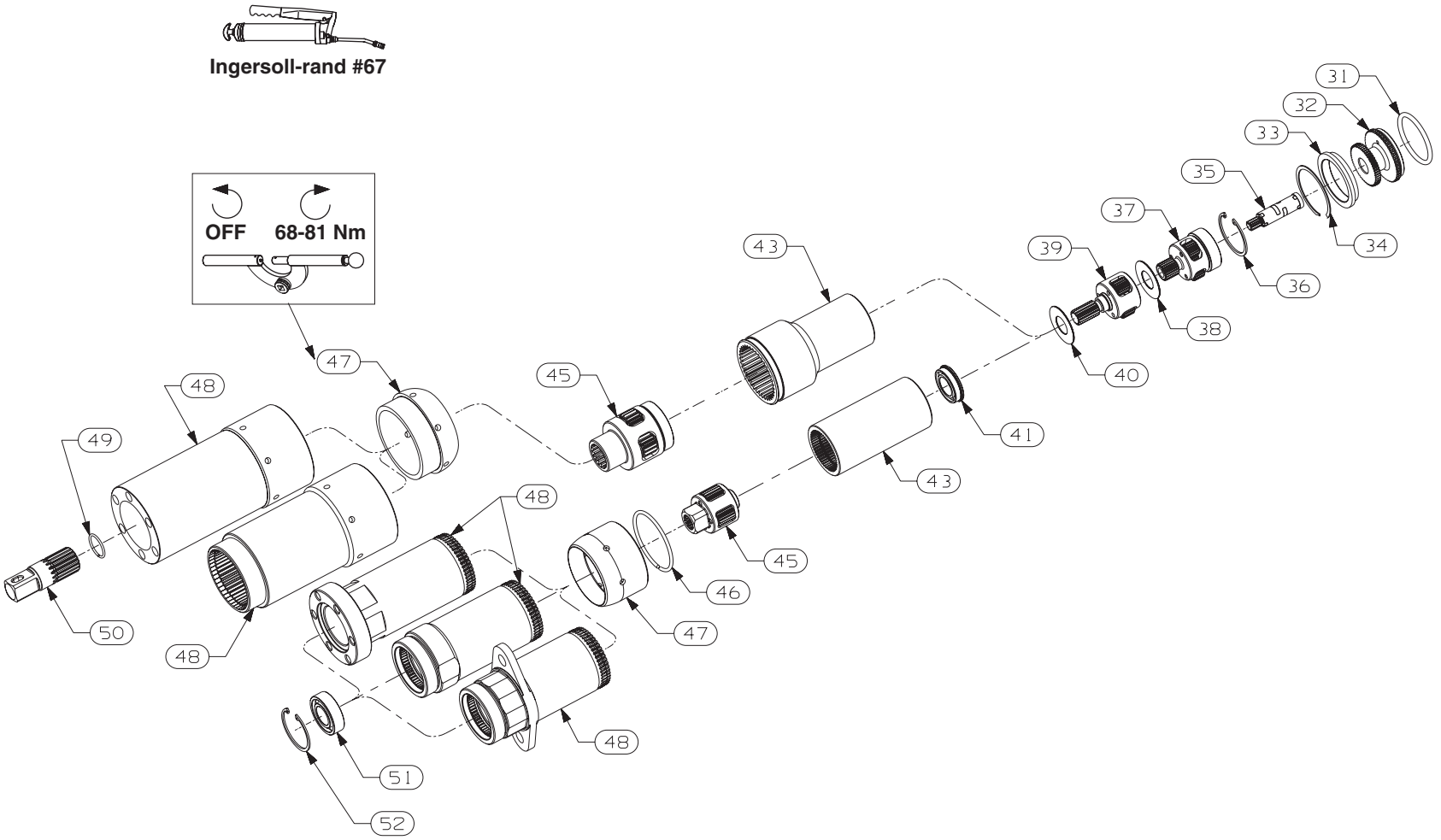
QE8 HIGH TORQUE MOTOR HOUSING ASSEMBLY, GRIPS AND LEVERS

When Ordering, use applicable Part Number

QE8 High Torque Motor Housing Assembly, Grips, and Levers Parts List					
Item	**Part Description**	**Part Number**	**Item**	**Part Description**	**Part Number**
1	Motor Housing Assembly		9	Retainer	GEA40-2309-104
	FOR MODELS:		10	O-Ring	GEA40-136-211
	QE8Z{ }070{ } { }	GEA120-D53-491	11	Housing Cover	GEA120-136
	QE8Z{ }090{ } { }	GEA120-D53-491	12	Warning Label	GEA40-99
	FOR MODELS:		13	Label-Cover Lens	GEA40-600
	QE8A{ }225{ } { }	GEA240-D53-491	14	Retaining Ring	GEA40-208
	QE8S{ }150{ } { }	GEA240-D53-491	15	O-Ring	GEA40-801
	QE8Z{ }150{ } { }	GEA240-D53-491	16	Spring	GEA40-329-52
	FOR MODELS:		17	Reverse Ring	GEA40-329
	QE8A{ }400{ } { }	# GEA400-D53-491	18	Handle Grip	GEA40-135
	QE8S{ }230{ } { }	# GEA400-D53-491	19	Handle Grip	GEA40-135SL
2	LED Board	GEA40-98	20	Handle Grip	GEA40-135EL
3	Ball	AV1-255	21	Sleeve	GEA40-137
4	Spring	GEA40-329-51	22	Socket Cap Screw (Low Head)	GEA40-135-68
5	Trigger	GEA40-273	23	Socket Head Cap Screw	GEA40-273EL-68
6	Spring	GEA40-273-51	24	Lever, Short	GEA40-273SL
7	Memory chip	TRP-A528	25	Lever, Extended	GEA40-273EL
8	Communication Board	GEA40-A2309			

Also includes GEF400-491-104

QE8 HIGH TORQUE GEARING COMPONENTS



(Dwg. TP2160_B)

QE8 HIGH TORQUE GEARING COMPONENTS

When Ordering, use applicable Part Number

	QE8 High Torque Gearing Parts List			
ANGLE	---	---	---	QE8A{ }225{ }{ }
IN LINE	---	---	---	QE8S{ }150{ }{ }
OFFSET	QE8Z{ }070{ }{ }	QE8Z{ }090{ }{ }	QE8Z{ }150{ }{ }	---

Item	Part Description	Part Number	Part Number	Part Number	Part Number
31	O-ring (I.D. 1.563 X .139)	---	---	---	---
32	Transducer Assembly	GEA120-A756-90	GEA120-A756-90	GEA240-A756-160	GEA240-A756-160
33	Spacer	DEA120-945	DEA120-945	GEA240-945	GEA240-945
*	Gear Case Assembly	GEP120-M37	GEP150-M37	GEP240-M37	GEA240-M37
34	Retainer	DEA120-29	DEA120-29	GEA240-208	GEA240-208
35	Pinion Coupler Assembly	DEA120-17	DEA120-17	DEA120-17	DEA120-17
36	Retaining Ring	W64-118	W64-118	W64-118	W64-118
37	Spindle Assembly (1st Stage)	DEA120-A216	DEA150-A216	DEA55-A216	DEA55-A216
	Spindle	---	---	---	---
	Planet Pin	---	---	---	---
	Planet Bearing	---	---	---	---
	Planet Gear (1st)	---	---	---	---
	Bearing				
38	Spacer	---	---	GEA240-80	GEA240-80
39	Spindle Assembly (2nd Stage)	DEA120-A8	DEA150-A8	GEA240-A216	GEA240-A216
	Spindle	---	---	---	---
	Planet Pin	---	---	---	---
	Planet Bearing	---	---	---	---
	Planet Gear (2nd)	---	---	---	---
40	Spacer	---	---	GEA240-80	GEA240-80
41	Bearing	---	---	GEA240-606	GEA240-606
43	Ring Gear	DEA120-406	DEA200-406	GEA240-406	GEA240-406

QE8 HIGH TORQUE GEARING COMPONENTS *(Continued)*

When Ordering, use applicable Part Number

		QE8 High Torque Gearing Parts List			
	ANGLE	---	---	---	QE8A{ }225{ }{ }
	IN LINE	---	---	---	QE8S{ }150{ }{ }
	OFFSET	QE8Z{ }070{ }{ }	QE8Z{ }090{ }{ }	QE8Z{ }160{ }{ }	---
Item	**Part Description**	**Part Number**	**Part Number**	**Part Number**	**Part Number**
45	Spindle Assembly (3rd Stage)	---	---	GEA240-A8	GEA240-A8
	Spindle	---	---	---	---
	Planet Pin	---	---	---	---
	Needle Rollers	---	---	---	---
	Spacer	---	---	---	---
	Planet Gear (3rd)	---	---	---	---
46	Retainer	DEF120-29	DEF120-29	GEF240-29	GEF240-29
47	Coupling Nut	GEF120-43	GEF120-43	GEA240-43	GEA240-43
48	Gear Case	GEP120-B37	GEP120-B37	GEP240-B37	GEA240-B37
49	Retaining Ring	---	---	---	---
50	Spindle	---	---	---	---
51	Bearing	R38P-606	R38P-606	---	---
52	Retaining Ring	W64-118	W64-118	---	---
	REFER ALSO TO THESE MANUALS	**P7781**	**P7781**	**P7781**	---

QE8 HIGH TORQUE GEARING COMPONENTS *(Continued)*

When Ordering, use applicable Part Number

	QE8 High Torque Gearing Parts List (Continued)		
ANGLE	QE8A{ }225F{ }	---	QE8A{ }400F{ }
IN LINE	QE8S{ }150F{ }	QE8S{ }230F{ }	---
OFFSET	---	---	---

Item	Part Description	Part Number	Part Number	Part Number
31	O-ring (I.D. 1.563 X .139)	---	GEF400-491-104	GEF400-491-104
32	Transducer Assembly	GEA240-A756-160	GEF400-A756-230	GEF400-A756-230
33	Spacer	GEA240-945	N/A	N/A
*	Gear Case Assembly	GEF240-M37	GEP400-M37	GEF400-M37
34	Retainer	GEA240-208	N/A	N/A
35	Pinion Coupler Assembly	DEA120-17	GEF400-17	GEF400-17
36	Retaining Ring	W64-118	W64-118	W64-118
37	Spindle Assembly (1st Stage)	DEA55-A216	DEA90-A216	DEA90-A216
	Spindle	---	---	---
	Planet Pin	---	---	---
	Planet Bearing	---	---	---
	Planet Gear (1st)	---	---	---
	Bearing	---	---	---
38	Spacer	GEA240-80	GEF400-80	GEF400-80
39	Spindle Assembly (2nd Stage)	GEA240-A216	GEF400-A216	GEF400-A216
	Spindle	---	---	---
	Planet Pin	---	---	---
	Planet Bearing	---	---	---
	Planet Gear (2nd)	---	---	---
40	Spacer	GEA240-80	GEF400-80	GEF400-80
41	Bearing	GEA240-606	---	---
43	Ring Gear	GEA240-406	GEF400-406	GEF400-406

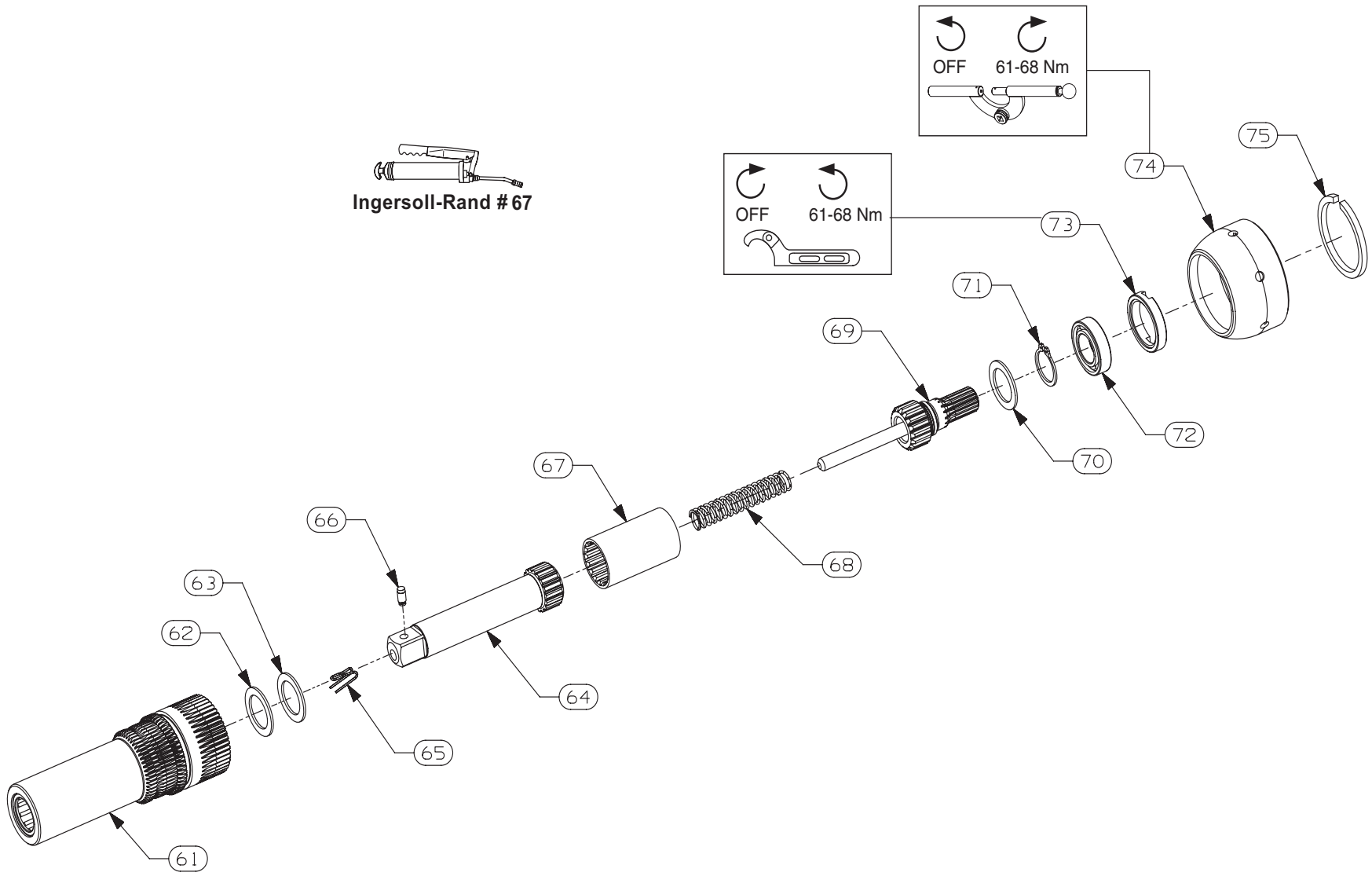
QE8 HIGH TORQUE GEARING PARTS LIST *(Continued)*

When Ordering, use applicable Part Number

		QE8 High Torque Gearing Parts List (Continued)		
	ANGLE	QE8A{ }225F{ }	---	QE8A{ }400F{ }
	IN LINE	QE8S{ }150F{ }	QE8S{ }230F{ }	---
	OFFSET	---	---	---
Item	**Part Description**	**Part Number**	**Part Number**	**Part Number**
45	Spindle Assembly (3rd Stage)	GEA240-A8	GEF400-A8	GEF400-A8
	Spindle	---	---	---
	Planet Pin	---	---	---
	Needle Rollers	---	---	---
	Spacer	---	---	---
	Planet Gear (3rd)	---	---	---
46	Retainer	GEF240-29	N/A	N/A
47	Coupling Nut	GEA240-43	GEF400-43	GEF400-43
48	Gear Case	GEF240-B37	GEP400-B37	GEF400-B37
49	Retaining Ring	---	GEF400-29	---
50	Spindle	---	GEF400-584	---
51	Bearing	---	---	
52	Retaining Ring	---	---	

This Page intentionally left Blank

QE8 HIGH TORQUE IN-LINE ATTACHMENT COMPONENTS



(Dwg. TP2293)

QE8 HIGH TORQUE IN-LINE ATTACHMENT COMPONENTS

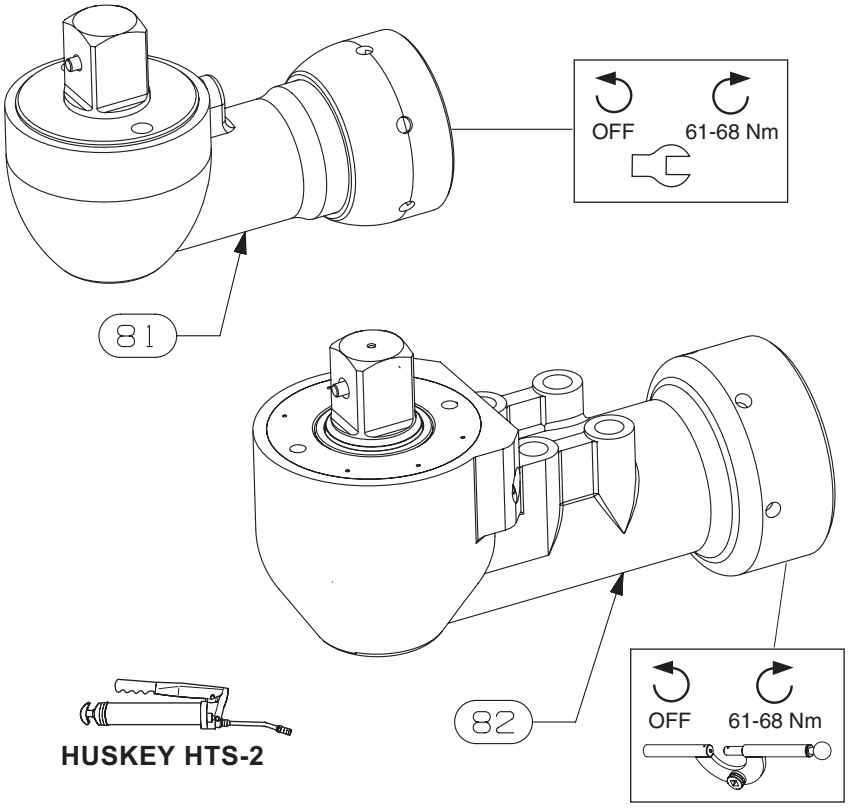
When Ordering, use applicable Part Number

QE8 In-line Spindles Parts List

Item	Part Description	Part Number	Item	Part Description	Part Number
●	In-Line Spindle Assemblies	---	66	Socket Retaining Pin	804-716
---	QE8S{ }150{ }41S08 (*1/2" Sq. Drive & 4" Long Shank*)	160E4S8	67	Coupler	---
---	QE8S{ }150{ }61S08 (*1/2" Sq. Drive & 6" Long Shank*)	160E6S8	---	*for* 41S08	120E4-581
---	QE8S{ }150{ }81S08 (*1/2" Sq. Drive & 8" Long Shank*)	160E8S8	---	*for* 61S08, and 81S08	120E6-581
61	Housing Assembly	---	68	Disengaging Spring	---
---	*for* 41S08	160E4-A580	---	*for* 41S08	120E4-626
---	*for* 61S08	160E6-A580	---	*for* 61S08, and 81S08	120E6-626
---	*for* 81S08	160E8-A580	69	Drive Spindle Assembly	160E4-A584
62	Washer	120E4-105	70	Washer	120E4-106
63	Washer	120E4-106	71	Retaining Ring	FEA100-20
64	Square Drive Spindle	---	72	Rear Spindle Bearing	GEA240-593
---	*for* 41S08	120E4S8-586	73	Bearing Cap	8SA32-531
---	*for* 61S08	120E6S8-586	74	Coupling Nut	GEA240-27
---	*for* 81S08	120E8S8-586	75	Retainer	160E4-29
65	Socket Retainer Spring	5UHD-718			

FOR MODEL	REFER TO THESE MANUALS
QE8Z{ }070{ }{ }, QE8Z{ }090{ }{ }	P7778
QE8Z{ }150{ }{ }	P7778
QE8S{ }230{ }{ }	P7777

QE8 ANGLE HEAD ATTACHMENTS

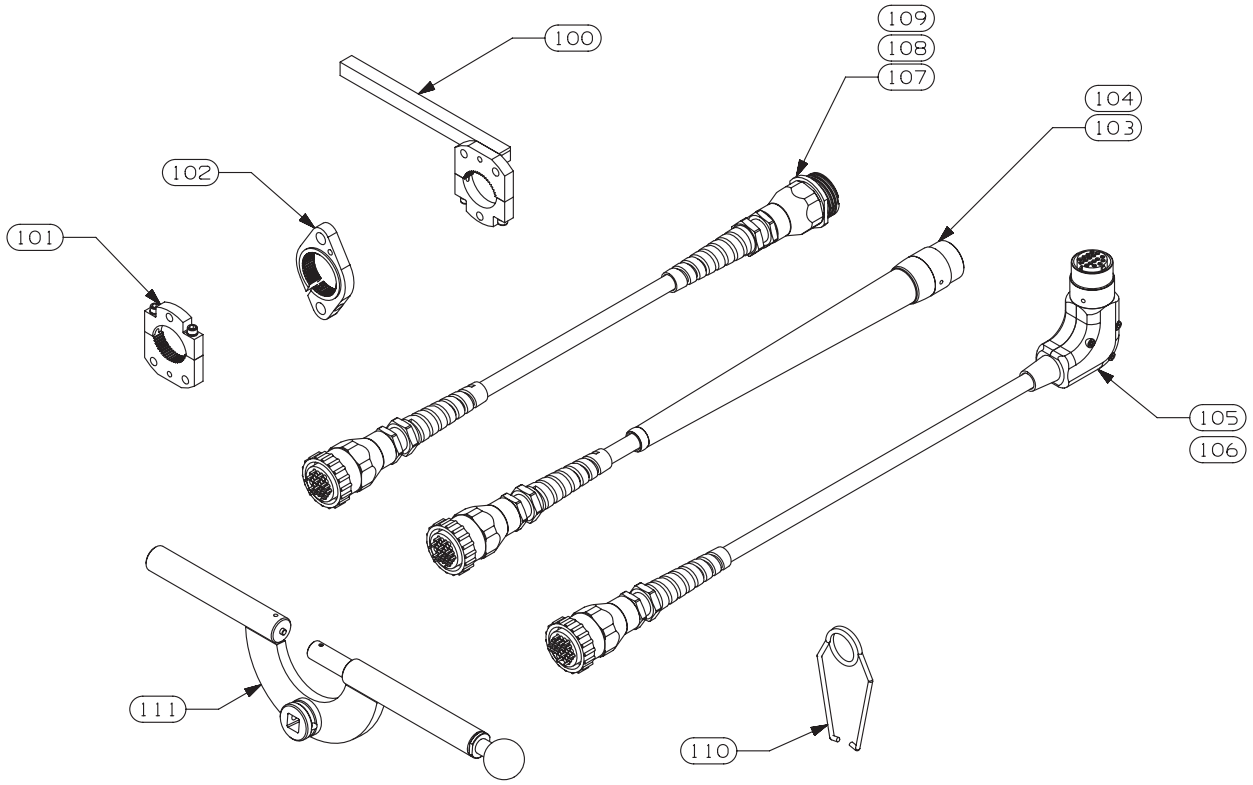


(Dwg. TP2294)

When Ordering, use applicable Part Number

QE8 Angle Head Attachments Parts List		
Item	**Product Identification Code**	**Part Number**
81	QE8A{ }225{ }A7S12	AA16S12
82	QE8A{ }400{ }A8S12	AA20S12

QE8 HIGH TORQUE ACCESSORIES



(Dwg. TP2292)

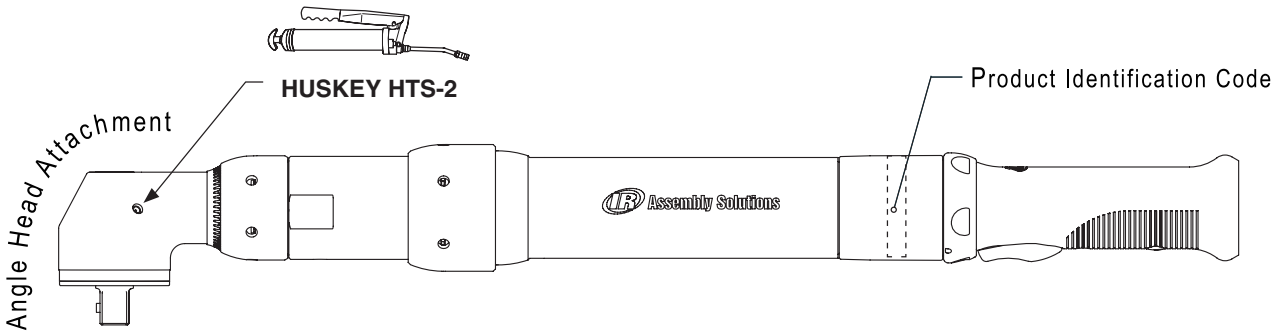
When Ordering, use applicable Part Number

QE8 High Torque Accessories Parts List		
Item	**Part Description**	**Part Number**
100	† Reaction Bar Assembly	DEA120-K48
101	† Mounting Plate Assembly	DAM120-K48
102	†Mounting Plate Assembly (Flanged)	GEM120-K48
103	Power Cord Assembly *(3 Meter)*	GEA40-C0RD-3M
104	Power Cord Assembly *(10 Meter)*	GEA40-C0RD-10M
105	Power Cord Assembly, 90 Deg. *(3 Meter)*	GEA40-C0RD-3M-90
106	Power Cord Assembly, 90 Deg. *(10 Meter)*	GEA40-C0RD-10M-90
107	Power Cord Extension Assembly *(10 Meter)*	GEA40-EXT-10M
108	Power Cord Extension Assembly *(20 Meter)*	GEA40-EXT-20M
109	Power Cord Extension Assembly *(40 Meter)*	GEA40-EXT-40M
110	Suspension Bail	7L-365
111	Spanner Wrench	GEA40-478

† FOR MODEL QE8{ }150{ }{ } NON-FLANGED MODELS ONLY

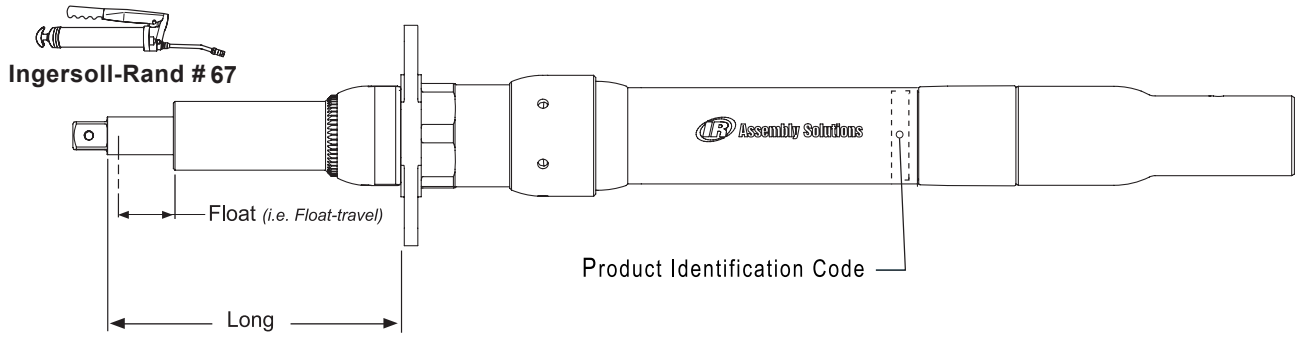
QE8 TOOL ASSEMBLIES

Angles



(Dwg. TP2161b)

In-Lines



(Dwg. TP2161a)

Table 1

Suggested Tools Parts List			
Item	**Tool Used**	**Description**	**Where Used?**
1	Spanner Wrench	I-R Part #GEA40-478	Coupling Nut
2	Pin Spanner Wrench	3 mm or 1/8” pin	Motor Housing Assembly, Cable
3	Torque Wrench	1/2” Sq. Drive, 50 ft-lb capacity	General use
4	Adjustable Pin Wrench	-----	In-Lines, Bearing Caps
5	Adjustable Wrench	-----	Coupling Nut (with flats)
6	5/64” Hex Key	-----	Cap Screws (Low Socket Head)
7	9/64” Hex Key	-----	Cap Screws (Regular Head)
8	Internal Snap Ring Pliers	-----	General use
9	Pick	-----	O-Rings (behind Reverse Ring), Smalley Ring, etc.

MAINTENANCE

General Instructions:

- Refer to Table 1 *"Suggested Tools Parts List"* for quick reference to the tools recommended for the following disassembly/assembly instructions.

⚠ WARNING

- **Repairs should be made only by authorized trained personnel. Consult your nearest Ingersoll-Rand Authorized Service Center.**
- **Disconnect the power cord from the receptacle before performing any maintenance on this or any other tool.**
- **Always use protective eyewear when performing maintenance on a tool or while operating a tool.**
- **Use of non-Ingersoll-Rand parts or failure to follow Maintenance Instructions may create a risk of electric shock or injury.**

LUBRICATION

Whenever this product is disassembled, clean the parts and re-lubricate them as follows:

1. Using appropriate tool, loosen the Attachment Coupling Nut (74).
2. Unthread Coupling Nut from Gear Case Assembly and remove Attachment.
3. Using appropriate tool, loosen the Gear Case Coupling Nut (47).
4. Unthread Coupling Nut and remove Gear Case Assembly.
5. Disassemble Gear Case.
6. Clean and degrease all parts except for the bearings, 1st Stage Spindle Assembly (37), 2nd Stage Spindle Assembly (39) and the 3rd stage Spindle Assembly (45).
7. Wipe clean the Spindle Assemblies with a clean, dry and lint-free rag.
8. Once cleaned, apply prescribed amounts of Ingersoll-Rand #67 Grease as follows:
   - 3 - 4 cc to central area between gears of each Spindle Assembly (37, 39 & 45).
   - Thin layer on Ring Gear teeth (43)
9. **For Models with an Angle Head Attachment:** Using HUSKY HTS-2 Grease, lubricate Angle Head (81 or 82) through Grease Fitting.
10. **For Models with an In-Line Attachment:** Using Ingersoll-Rand #67 Grease, lubricate the Square Drive Spindle Bearings, the Drive Spindle (64) and the Disengaging Spring (68).

DISASSEMBLY

⚠ WARNING

- **This procedure is to be performed by an authorized, trained repair person. To ensure proper functioning of the tool:**
- **When replacing the Motor Housing Assembly (1), always ensure that the Memory Chip (7), Communication Board (8), Gear Case Assembly, and Attachment are all assembled as a set with the new Motor Housing Assembly.**

⚠ CAUTION

- **When replacing an Attachment, always use the Angle Head Attachment designed for that model. Never replace an Angle Head Attachment with an In-Line Attachment.**
- **When replacing a Gear Case Assembly, always use the Assembly designed for that model.**

General Instructions for Disassembly:

1. Do not disassemble the tool any further than necessary to replace or repair damaged parts.
2. To protect part surfaces and to prevent distortion of Housings and threaded joints, use care when grasping the tool.
3. Avoid clamping non-metal surfaces, unless directed otherwise.
4. Do not remove any press fit part or any part of an assembly unless its removal is necessary for repair or replacement.

Attachments

⚠ WARNING

- **NEVER grasp the tool in a vise, as this will likely result in damage to the tool causing wire leads to malfunction, which increases the risk of electric shock.**

CAUTION

- **When installing or removing a Coupling Nut, ALWAYS hold the tool by the Spanner holes or flats as provided on the Assembly Housing.**

Attachment Removal

FOR MODELS:

QE8A{ }225{ }{ }
QE8A{ }400{ }{ }
QE8S{ }150{ }{ }

1. Using Spanner Wrench #GEA40-478 (or other appropriate wrench), grasp the Spanner holes of the Coupling Nut (74).
2. Holding firmly onto tool with the wrench flats (or Spanner holes) of the Gear Case (48), unscrew Coupling Nut and pull the Attachment out of the Gear Case.

FOR ALL OTHER MODELS:

1. Remove screws around the flange of the Attachment while supporting both ends of the tool.
2. Pull Attachment from the Mounting plate and Gear Case or Offset Gear Case.
3. Pull remainder of the Tool from mounting plate.

Angle Head Attachments - Disassembly

DISASSEMBLY OF ANGLE HEAD ATTACHMENTS IS NOT RECOMMENDED.

In-Line Attachments - Disassembly

FOR 160E4S8, 160E6S8 & 160E8S8 IN-LINE ATTACHMENTS.

1. Looking down the hole of the Square Drive Spindle's (64) square socket, locate Retaining Pin (66) and Retaining Spring (65).
2. If necessary, use a pointed metal probe to pull retaining Spring out of Spindle cavity.
3. Also if necessary, remove Pin from Square Drive Spindle (64).
4. Using Spanner Wrench #GEA40-478 (or other appropriate wrench), grasp the Spanner holes (or flats) of the Coupling Nut (74).
5. If desired, remove Coupling Nut Retainer (75) using the appropriate tool.

Note: *In the following step, the Bearing Cap (73) has a left-hand thread.*

6. Using an adjustable Pin Wrench, unscrew Bearing Cap (73).
7. Pull the Drive Spindle Assembly (69) out of Housing Assembly (61).
8. If necessary, using a bearing puller tool, press the Rear Spindle Bearing (72) off the Drive Spindle Assembly (69). Then remove the Retaining Ring (71), and Washer (70).
9. Now tilt Spindle Housing, causing the Disengaging Spring (68), Coupler (67), Square Drive Spindle (64), and Washers (62) and (63) to slide out.

FOR ALL OTHER SPINDLES:
REFER TO THE APPROPRIATE MAINTENANCE MANUAL LISTED IN THE QE8 HIGH TORQUE IN-LINE SPINDLE PARTS LIST.

Motor Housing Disassembly

Gear Case Removal

FOR ALL MODELS:

1. Carefully engage spanner holes on the Gear Case Coupling Nut (47) with the appropriate tool and loosen the Coupling Nut while gripping the wrench flats of the Gear Case (48) with the appropriate wrench.
2. Unthread the Coupling Nut and pull the Gear Case Assembly off the Motor Housing Assembly.

FOR MODELS WITH OFFSET GEAR CASES:

QE8Z{ }070{ }{ }
QE8Z{ }090{ }{ }
QE8Z{ }150{ }{ }

1. Remove the screws around the flange of the Offset Gearing that attach it to the Gear Case assembly with the appropriate wrench while gripping the wrench flats of the Tool Gear Case with the appropriate wrench.
2. Pull Offset Gearing from the Gear Case.

Gear Case - Disassembly

FOR GEP120-M37 AND GEP150-M37

1. Remove the Pinion Coupler Assembly (35) from the Motor Housing Assembly.
2. If the Coupling Nut requires replacement, spread the ends of the Retaining Ring (46) and remove it from the Gear Case Assembly. Slide Coupling Nut off the Gear Case Assembly.
3. Work a pointed tool under the Ring Gear Retainer (34) and spiral it out of the Gear Case (48).
4. Tilt the Gear Case Assembly so that the Ring Gear (43) and 1st Stage Spindle Assembly (37) slide out of the Gear Case Assembly.
5. With the motor end of the Gear Case Assembly standing on the table of an Arbor press, carefully press the 2nd Stage Spindle Assembly (39) out of the Bearing (51) while lightly supporting the Spindle Assembly from beneath to avoid breakage.
6. Using internal snap ring pliers, remove the Retaining Ring (52) from the threaded end of the Gear Case (48).
7. Remove Bearing (51) from the Gear Case.

FOR GEA240-M37, GEF240-M37 AND GEP240-M37

1. Remove the Pinion Coupler Assembly (35) from the Motor Housing Assembly
2. Work a pointed tool under the Ring Gear Retainer (34) and spiral it out of the Gear Case (48).
3. Tilt the Gear Case Assembly so that the Ring Gear (43), 1st Stage Spindle Assembly (37), 2nd Stage Spindle Assembly (39) and 3rd stage Spindle Assembly (45) slide out of the Gear Case (48) all together.
4. Using internal snap ring pliers, remove the Retaining Ring (36) from the Ring Gear.
5. Tilt the ring gear and slide the 1st Stage Spindle Assembly (37) and 2nd Stage Spindle Assembly (39) out of the Ring Gear.
6. With the output end of the Ring Gear resting on the table of an arbor press, carefully press the 3rd Stage Spindle Assembly (45) from the Spindle Bearing (41) and out of the Ring Gear.
7. From the output end of the Ring Gear, push the Spindle bearing (41) out of the Ring Gear.
8. If the Coupling Nut requires replacement, spread the ends of the Retaining Ring (46) and remove it from the Gear Case Assembly.

FOR GEF400-M37 AND GEP400-M37

1. Remove the Pinion Coupler Assembly (35) from the Motor Housing Assembly.
2. If the Coupling Nut requires replacement, slide the Coupling Nut off the Motor Housing Assembly.
3. From the output end of the Gear Case Assembly, push the 3rd Stage Spindle Assembly (45) until the Ring Gear, 1st Stage Spindle Assembly (37), 2nd Stage Spindle Assembly (39) and 3rd Stage Spindle Assembly (45) slide out of the Gear Case (48) all together.
4. Using internal snap ring pliers, remove the Retaining Ring (36) from the Ring Gear.
5. Tilt the ring gear and slide the 1st Stage Spindle Assembly (37) and 2nd Stage Spindle Assembly (39) out of the Ring Gear.
6. From the output end of the Ring Gear, carefully pull the 3rd Stage Spindle Assembly (45) out of the ring gear. It may be necessary to push it from the opposite side.
7. If necessary, remove the O-ring (31), from the Motor Housing Assembly.

FOR OFFSET GEARING DISASSEMBLY:

REFER TO THE APPROPRIATE MAINTENANCE MANUAL LISTED IN THE QE8 HIGH TORQUE GEARING PARTS LIST.

⚠ WARNING

- **This procedure is to be done by an authorized, trained repair person. To ensure proper functioning of the tool:**

When replacing the Motor Housing Assembly (1), always ensure that the Memory Chip (7), Communication Board (8), Gear Case Assembly, and Attachment are all assembled as a set with the new Motor Housing Assembly.

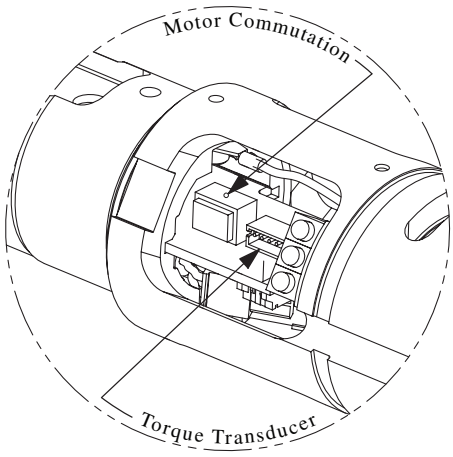
Grips

1. **For models with levers,** use the appropriate hex key to loosen Cap Screws (23) from lever (24 or 25) and remove lever from Handle Grip (19 or 20).
2. Use the appropriate hex key to loosen the Cap Screw (22) from Handle Grip (18, 19, 20 or 21).
3. Slide Handle Grip off of Motor House Assembly (1).

Disassembly of External Components

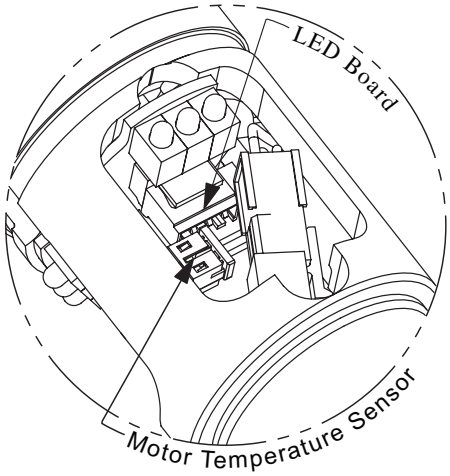
1. Dislodge O-rings (15) and remove Memory Chip (7) from assembly.
2. Remove Trigger mechanism (5) from Motor Housing Assembly.
3. Remove Spring (6) from Trigger mechanism.
4. Slide Reverse Ring (17) away from Motor Housing Assembly, being careful not to lose the Detent Ball (3) or Springs (4) and (16).
5. Remove Retaining Ring (14) from behind Label Cover Lens (13).
6. In a sliding motion, pull Warning Label (12) and Label Cover Lens (13) off end of Motor Housing Assembly.
7. Slide Housing Cover (11) off Motor Housing Assembly.
8. Remove O-ring (10) located at front of Housing Cover.

Communication Board



Torque and Motor Connector(s)

(Dwg. TP2162a)



LEDs and Temperature Connector(s)

(Dwg. TP2162b)

Disassembly of Internal Components

1. Remove Retainer (9) used to retain Communication Board (8), located at rear end of Motor Housing Assembly in Connector cavity.
2. In large cavity area(s) of Motor Housing, disconnect the Motor Phase connector. *(Refer to TP2162b)*
3. Disconnect the Motor temperature-sensor connector from the Communication Board. *(Refer to TP2162b)*
4. Disconnect the Motor Commutation connector from the Communication Board. *(Refer to TP2162a).*

5. Disconnect the Torque Transducer connector from the Communication Board. *(Refer to TP2162a)*
6. Disengage female socket located on front end of Communication Board, from male connector located at center of LED Board (2) by gently sliding board from Motor Housing Assembly.
7. Remove LED Board from Motor Housing Assembly. *(Refer to TP2162b)*

Transducer Removal

1. Locate the cavity found at end of long axial groove running along the outer surface of the Motor Housing Assembly.
2. Make sure the Transducer connector is disconnected from the Communication Board.
3. Gently pull Transducer (32) out of the Motor Housing Assembly, while feeding the Transducer wire and connector through the cavity in the Motor Housing Assembly.
4. Carefully push Transducer's connector through the cavity of the Motor Housing Assembly.

ASSEMBLY

Motor Housing Assembly

General Instructions

1. To protect the part's surfaces and to prevent distortion of Housings and threaded joints, use care when grasping the tool.
2. Always press on the inner ring of a ball-type bearing when installing the bearing onto a shaft.
3. Always press on the outer ring of a ball-type bearing when pressing the bearing into a bearing recess.
4. Refer to the "Lubrication" section of this manual for instruction on how to properly grease this tool.

⚠ WARNING

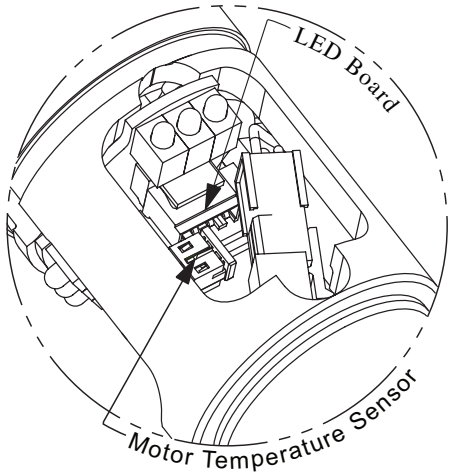
- **This procedure is to be done by an authorized, trained repair person. To ensure proper functioning of the tool:**

When replacing the Motor Housing Assembly (1), always ensure that the Memory Chip (7), Communication Board (8), Gear Case Assembly, and Attachment are all assembled as a set with the new Motor Housing Assembly.

Internal Components

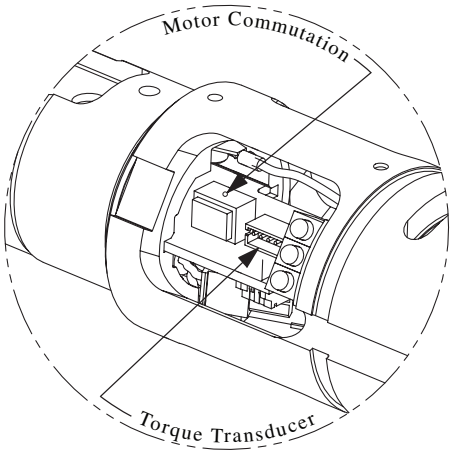
1. Insert the LED Board (2) through one of the Motor Housing Assembly's three large cavities and lay the three tabs of the LED Board against the three ledges of the Motor Housing Assembly *(Refer to TP2162a)* making sure that the motor commutation wires properly pass through the cutout in the LED board.
2. Using two of the three internal axial grooves located in the connector end of the Motor Housing Assembly, slide Communication Board (8) into Motor Housing Assembly.
3. Press connector located on front end of Communication Board into socket located at center of LED Board.
4. Route Motor Commutation wiring to same side of Communication Board; snap connector into socket marked Motor. *(Refer to TP2162a)*
5. Route Motor Temperature Sensor Connector cable to opposite side of Communication Board; snap Motor Temperature-Sensor connector into the Motor Temperature-Sensor socket. *(Refer to TP2162b)*
6. Through large cavities of Motor Housing Assembly, connect Motor Phase Female Connector to Male Connector of Motor.
7. Install Retainer (9) behind Communication Board in connector cavity in the end of the Motor Housing Assembly.

Communication Board (Close-Up)



LEDs and Temperature Connector(s)

(Dwg. TP2162a)



Torque and Motor Connector(s)

(Dwg. TP2162b)

Transducer Installation

1. Insert Transducer Assembly (32) into the Motor Housing Assembly, wire end first, guiding Transducer's connector out through the cavity found at end of Motor Housing Assembly's long outer groove.
2. Carefully pull Transducer's connector and wiring through cavity of Motor Housing Assembly.
3. Align and engage Transducer's gear teeth with the gear teeth located inside the end of the Motor Housing Assembly. Be certain that the Transducer wire exits the Transducer directly over the access cavity through which the wire was fed.
4. Continue inserting the Transducer assembly until it is fully seated.
5. Snap Transducer's connector into Communication Board (8) socket marked Torque. *(Refer to TP2162a)*

External Components

1. Slide O-ring (10) into groove located at front end of Motor Housing Assembly.
2. Slide on Housing Cover (11), ensuring that Transducer and Motor wires are not disturbed.
3. Slide Warning Label (12) into Label Cover Lens (13). Note Warning Label and Label Cover Lens slot and tab alignment features.
4. Slide Label Cover Lens and Warning Label over Motor Housing Assembly grip area. Orient tabs of Label Cover Lens with mating slots in Motor Housing Assembly, and slide together.
5. Install Retaining Ring (14) into groove behind Label Cover Lens.
6. Place Spring (16) into Reverse Ring (17).
7. Install and depress Ball (3) and Spring (4) and then slide Reverse Ring onto Motor Housing Assembly.

When replacing the Motor Housing Assembly (1), always ensure that the Memory Chip (7), Communication Board (8), Gear Case Assembly, and Attachment are all assembled as a set with the new Motor Housing Assembly.

8. Install Memory chip (7) into Housing with terminals aligned with O-ring groove.
9. Slide two O-rings (15) into groove to retain Memory chip.
10. Install Spring (6) on post in middle of Trigger (5) and install Trigger into Motor Housing Assembly.
11. **For models with Extended Lever (25),** install an additional spring on Trigger's auxiliary post.
12. Slide Handle Grip (18, 19, 20, or 21) onto Motor Housing Assembly.
13. Apply a medium strength thread locker to Low Head Socket Cap Screw (22).
14. Install Low Head Socket Cap Screw into Motor Housing Assembly.
15. Torque Socket Cap Screw to 10 to 15 lb_f • in *(1.1 to 1.7 Nm)*.
16. **For models with Levers**:
    a. Place Lever (24 or 25) in position against Handle Grip and install lever Socket Cap Screws (23).
    b. Torque Socket Cap Screw (23) to 5 to 10 lb_f • in *(0.5 to 1.1 Nm)*.

⚠ WARNING

- **This procedure is to be performed by an authorized, trained repair person. To ensure proper functioning of the tool:**
- **In the course of disassembling or assembling this product, beware of any attempt to separate the gear case from or tighten the gear case to the motor housing assembly. Destruction of the transducer wire will result.**

⚠ CAUTION

- **When replacing an Attachment, always use the Angle Head Attachment designed for that model. Never replace an Angle Head Attachment with an In-Line Attachment.**
- **When replacing a Gear Case Assembly, always use the Assembly designed for that model.**

Gear Case - Assembly

FOR GEP120-M37 AND GEP150-M37

1. Ensure that all the gears are free of debris.
2. Apply 2-3 cc of IR #67 grease to the central area between the gears and the surface of the gear teeth of the 1st Stage Spindle Assembly (37) and the 2nd Stage Spindle Assembly (39).
3. Insert Bearing (51) into threaded end of Gear Case (48) and push it in until it seats against the shoulder in the Gear Case.
4. Assembly the Retaining Ring (52) into the groove directly in front of the Bearing with internal snap ring pliers.
5. Support the Gear Case Assembly, threaded end down, on the inner race of Bearing (51).
6. Position the 2nd Stage Spindle Assembly (39) on the inner race of the Bearing (51) inside the Gear Case with the splined end of the Spindle Assembly facing the Bearing.
7. With an appropriate tool, press the 2nd Stage Spindle Assembly into Bearing (51) until the Spindle Assembly seats against the inner race of the Bearing.
8. Coat the inside and outside surfaces of the Ring Gear (43) with IR #67 grease.
9. Insert the Ring Gear into the Gear Case with the end of the Ring Gear having an internal groove towards the motor.
10. Align the Ring Gear teeth with those of the planets in the 2nd Stage Spindle Assembly and slide the Ring Gear into the Gear Case until it stops against the shoulder inside the Gear Case.
11. Install the Retainer (34) into the groove inside the motor end of the Gear Case to secure the Ring Gear.
12. Insert the 1st Stage Spindle Assembly (37) into the Gear Case and engage the teeth of the gear on the Gear Head Assembly with the planet gears of the 2nd Stage Spindle Assembly while aligning the planet gears of the Gear Head Assembly with the Ring Gear.
13. Install Retaining Ring (36) into groove in the end of the Ring gear.
14. Slide the Coupling Nut (47) on the input end of the Gear Case (48). Using the proper tool, slide the Retaining Ring (46) over the end and into the groove of the Gear Case.

FOR GEA240-M37, GEF240-M37 AND GEP240-M37

1. Ensure that all the gears are free of debris.
2. Apply 3 - 4 cc of IR #67 grease to the central area between the gears and the surface of the gear teeth of the 1st Stage Spindle Assembly (37), the 2nd Stage Spindle Assembly (39) and the 3rd Stage spindle Assembly (45).
3. Coat the inside and outside surfaces of the Ring Gear (43) with IR #67 grease.
4. Insert the Spindle Bearing (41) into the fine pitch end of the Ring Gear (43) with the flanged side of the bearing facing out until the bearing rests in the interior bore deep inside the ring gear. This may require moderate pressure.
5. Engage the planets of the 3rd Stage Spindle (45), squared end out, with the Ring Gear and insert it until it contacts the installed Spindle Bearing (41)
6. Position the Assembly of the previous step with the 3rd Stage Spindle resting on the table of an arbor press.
7. With an appropriate tool, press the inner race of the Spindle Bearing (41) onto the 3rd Stage Spindle Assembly until the Spindle Assembly seats against the inner race of the Bearing.
8. Apply a coating of Ingersoll Rand #67 grease to the Spacer (40) and install the spacer on top of the Spindle Bearing (41).
9. Install the 2nd Stage Spindle (39). Be sure to engage all gears properly prior to applying any force.
10. Apply a coating of Ingersoll Rand #67 grease to the Spacer (38) and install the spacer on top of the 2nd Stage Spindle (39).
11. Install the 1st Stage Spindle (37). Be sure to engage all gears properly prior to applying any force.
12. Install the Retainer (36) into the groove inside the motor end of the Ring Gear.
13. Install the Ring Gear containing the Spindles, output end first, into the Gear Case (48) .
14. Install Retaining Ring (34) into the internal groove in the end of the Gear Case.
15. Slide the Coupling Nut (47) onto the input end of the Gear Case (48). Using the proper tool, slide the Retaining Ring (46) over the end and into the external groove of the Gear Case.

FOR GEF400-M37, AND GEP400-M37

1. Ensure that all the gears are free of debris.
2. Apply 3 - 4 cc of IR #67 grease to the central area between the gears and the surface of the gear teeth of the 1st Stage Spindle Assembly (37), the 2nd Stage Spindle Assembly (39) and the 3rd Stage spindle Assembly (45).
3. Coat the inside and outside surfaces of the Ring Gear (43) with IR #67 grease.

4. Engage the planets of the 3rd Stage Spindle (45) with the large outer diameter end of the Ring Gear and insert it until its spindle bearing seats in the Ring Gear bearing bore.
5. Apply a coating of Ingersoll Rand #67 grease to the Spacer (40) and install the spacer on top of the 3rd Stage Spindle (45) from the small outer diameter end of the Ring Gear.`
6. Install the 2nd Stage Spindle (39). Be sure to engage all gears properly prior to applying any force.
7. Apply a coating of Ingersoll Rand #67 grease to the Spacer (38) and install the spacer on top of the 2nd Stage Spindle (39).
8. Install the 1st Stage Spindle (37) Be sure to engage all gears properly prior to applying any force.
9. Install the Retainer (36) into the groove inside the motor end of the Ring Gear.
10. Install the Ring Gear containing the Spindles, output end first, into the Gear Case (48) .
11. Assembly O-ring (31) into the proper internal groove in the output end of the Motor Housing Assembly.
12. Slide the Coupling nut (47), threaded side first over the Motor Housing Assembly.
13. **FOR GEP400-M37 ONLY**:
    a. Assemble Retaining ring (49) to groove in Spindle (50)
    b. Insert Spline of Spindle (50) into 3rd Stage Spindle (45)

FOR OFFSET GEARING ASSEMBLY:
REFER TO THE APPROPRIATE MAINTENANCE MANUAL LISTED IN THE QE8 HIGH TORQUE GEARING PARTS LIST.

Gear Case Assembly Installation

ALL MODELS

1. Install the Pinion Coupler Assembly (35) on the pinion of the motor.
2. Rotate the Gear Case Assembly to the desired orientation relative to the Motor Housing Assembly (1).
3. Insert the Motor Housing Assembly (1) into the Gear Case (48).
4. Align and engage the gear of the Pinion Coupler Assembly (35) with the Planets of the 1st Stage Gear Head Assembly (37) while engaging the Ring Gear (43) with the Transducer (32) teeth. It may be necessary to rotate the 3rd Stage Spindle Assembly (39) to aid in assembly.
5. Thread Coupling Nut (47) to the appropriate threads and while using the appropriate tool and the spanner holes on the gearcase torque the Coupling Nut (47) to 50 - 60 ft • lbs *(68 - 81 Nm)*.

FOR MODELS WITH OFFSET GEAR CASES:

QE8Z{ }070{ }{ }
QE8Z{ }090{ }{ }
QE8Z{ }150{ }{ }

1. Insert Gear Case into the Offset Gearcase Input Flange.
2. Align the flange holes of the Offset Gear Case flange and Tool Gear Case and thread the Cap Screws into the Tool Gear Case flange.
3. Torque Cap Screws as follows:

   QE8Z{ }070{ }{ }, QE8Z{ }090{ }{ } and QE8Z{ }150{ }{ }
   18.4 - 25.4 ft • lbs *(25 - 34.5 Nm)*

Attachments

In-Line Attachment - Assembly

FOR 160E4S8, 160E6S8 & 160E8S8 IN-LINE ATTACHMENTS

1. Install Socket Retaining Pin (66) into small hole provided in one of the flat walls of the square Spindle.
2. With Pin in place, locate Pin's groove inside large end-hole of Square Drive Spindle (64).
3. Position Spring (65) inside large hole of Square Drive Spindle such that the free ends of the Socket Retaining Spring are faced away from the hole and the closed side of the Spring straddles the Socket Retaining Pin.
4. Holding the Socket Retaining Pin steady, push Spring down hole of square Spindle until the Socket Retaining Spring's wire engages Socket Retaining Pin.
5. Socket Retaining Pin is properly installed when Socket Retaining Spring snaps into place.
6. Lubricate the bearings of the Housing Assembly (61) with Ingersoll-Rand # 67 Grease.
7. Slide Washer (62) and Washer (63) onto Square Drive Spindle and insert Square Drive Spindle (64) into Housing Assembly (61).
8. Align the Coupler (67) to slide over spline of Square Drive Spindle.
9. Slide Coupler into position in Housing Assembly (61).
10. Slide Washer (70) on the Drive Spindle Assembly (69).
11. Use snap-ring Pliers to install the Retaining Ring (71) on top of the Washer.
12. Press on Rear Spindle Bearing (72) to Drive Spindle Assembly (69).
13. Place Disengaging Spring (68) over Drive Spindle Assembly.
14. Align the Drive Spindle Assembly with spline of Coupler and insert Drive Spindle Assembly into Housing Assembly (61).
15. Apply one drop of Perma-Lok MM-115 to threads of Bearing Cap (73).
16. Carefully grasp the Housing Assembly.

Note: In the following step, the Bearing Cap (73) has a left-hand thread.

17. Using the appropriate tool, tighten Bearing Cap (73) to between 45 - 50 lb_f • ft *(61 - 68 Nm)* of torque.
18. Slide Coupling Nut (74) over Housing Assembly (61).
19. Using an appropriate tool, install Retainer (75) onto spline of Housing Assembly until seated into groove.
20. Spin Coupling by hand to check freedom of movement.

FOR ALL OTHER SPINDLE ASSEMBLIES:
REFER TO THE APPROPRIATE MAINTENANCE MANUAL LISTED IN THE QE8 HIGH TORQUE IN-LINE SPINDLE PARTS LIST.

Attachment - Installation

FOR MODELS:

QE8A{ }225{ }{ }
QE8A{ }400{ }{ }
QE8S{ }150{ }{ }

1. Position the Attachment appropriately.
2. Engage the spline on the input spindle of the Attachment with the matching internal spline of the 3rd Stage Spindle Assembly (45), and then engage the spline on the Attachment Housing with that of the Gear Case (48).
3. Thread the Coupling Nut (74) onto the Gear Case.
4. While holding the tool using an appropriate wrench on the wrench flats (or spanner holes) of the Gear Case, torque Coupling Nut to between 45 - 50 lb_f • ft *(61 - 68 Nm)*.

FOR ALL OTHER MODELS:

1. Insert Gear Case or Offset Gear Case into the Tool mounting plate.
2. Insert Attachment to the Opposite side of the Mounting Plate and properly engage the drive spindle with the Gear Case or Offset Gear Case Output Spindle.
3. Align the mounting holes of the Attachment to the Mounting plate and to the Gear Case or Offset Gear Case and insert the Cap Screws through the holes in the flange of the Attachment and mounting plate.
4. Torque Cap Screws to the Gear Case or Offset Gear Case as follows:

   ALL MODELS:
   18.4 - 25.4 ft • lbs (25 - 34.5 Nm)

QE8 Series Wiring *(Cable)* Chart			
Connector Pin	**Wire Color (Cable)**	**Logic**	**Connector Pin**
A	Red	VCC	13
B	Black	COM	14
C	Gray	Spare 1	12
D	Pink	Spare 2	27
E	Brown	Spare 4	15
F	Yellow	Sine	21
G	Orange	Cosine	28
H	Violet	Spare 3	7
J	Green	Ground Sense	20
K	Blue	RX+	5
L	Blue/White	RX-	6
M	White	TX-	8
N	White/Blue	TX+	9
U	Red	Motor Phase B	23
V	Black	Motor Phase C	34
W	White	Motor Phase A	36
X	Green/Yellow	Ground	25
---	---	TX Shield	1
---	---	RX Shield	4
---	---	Hall Shield	22
---	---	Motor Shield	16

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.

When the life of the tool has expired, it is recommended that the tool be disassembled, degreased and the parts be separated by material so that they can be recycled.

SERVICE NOTES

SERVICE NOTES

SERVICE CENTERS

Centres d'entretien • Ingersoll-Rand Niederlassungen • Centri di Assistenza • Centros de Servicio • Service Centra • Servicentre • Servicecenter • Servicesenter • Huoltokeskus • Centros de Assistência Técnica • Κέντοα Εξυποέτησης

Ingersoll-Rand
1872 Enterprise Drive
Rochester, MI 48309
Phone: (248) 293-5700
Fax: (248) 293-5800

UK
Ingersoll-Rand & Co. Ltd.
Swan Lane (Gate 3)
Hindley Green
Wigan WN2 4EZ UK
Phone: +44 (0) 1942 257 171
Fax: +44 (0) 1942 503 450

India
Ingersoll Rand Wadco
Tools Pvt. Limited
37-A, Site-4, Sahibabad
Industrial Area
Ghaziabad-201 010 India
Tel : +91-120-2895116-126
Fax: +91-120-2895127

OFFICE LOCATIONS

Asia Pacific Operations
Ingersoll-Rand Ltd.
42 Benoi Road
Jurong, Singapore 629903
Phone: 65-861-1555
Fax: 65-861-0317

Australia
Ingersoll-Rand Ltd.
Landmark Corporate Center
Level 2
454-472 Nepean Highway
Frankston, Vic 3199
Australia
Phone: 61 3 8781 1600
Fax: 61 3 8781 1611

Canada
National Sales Office
Regional Warehouse
Toronto, Ontario
51 Worcester Road
Rexdale, Ontario M9W 4K2
Phone: (416) 213-4500
Fax: (416) 213-4510
Order Desk
Fax: (416) 213-4506

China
Ingersoll-Rand Productivity Solutions
Room 1616, South Tower,
Guangzhou World Trade Center Complex,
371 Huanshi East Road
Guangzhou, 510095
China
[86] 20 8776 4754 or 86 20 8776 4755

Czech Republic
Ingersoll-Rand Productivity Solutions
Ostrovskeho 34 151 28 Prague
Czech Republic
Phone: +420 2 57 109 756/7
Fax: +420 2 57 109 758

France
Ingersoll-Rand Productivity Solutions
A.S. Division
Zone du Chêne Sorcier
B.P. 62
Les Clayes sous Bois Cedex 78346
Phone: +33 (0) 1 30 07 69 00
Fax: +33 (0) 1 30 07 69 82

Germany
Ingersoll-Rand European Sales Ltd.
c/o Intersoll-Rand GmbH
Postfach 10 09 54
45409 Mülheim / Ruhr Germany
Phone: +49 (0) 208 9994 0
Fax: +49 (0) 208 9994 444
e-mail: Assembly_Solutions@eu.irco.com

India
Ingersoll Rand Wadco Tools Pvt. Limited
37-A, Site-4, Sahibabad Industrial Area
Ghaziabad-201 010 India
Tel : +91-120-2895116-126
Fax: +91-120-2895127

Italy
Productivity Solutions
Ingersoll-Rand Italia S.r.l.
Strada Provinciale Cassanese 108
20060 Vignate (Milano), Italy
Phone: +39 02-95056-261
Fax: +39 02-95360-159

OFFICE LOCATIONS *(CONTINUED)*

Japan
IR Japan, Ltd.
LS Bldg. 2F, 1-1-17 Kami-Ohsaki, Shinagawa-ku
Tokyo, 141-0021
Japan
[81] 3-5420-3397

Latin America Operations
Ingersoll-Rand
730 N.W. 107 Avenue
Suite 300, Miami, FL, USA
33172-3107
Phone: (305) 559-0500
Fax: (305) 222-0864

Europe, Middle East and Africa
Ingersoll-Rand
Douai Operations
111, Avenue Roger Salengro
59450 Sin Le Noble, France
Phone: (33) 3-27-93-08-08
Fax: (33) 3-27-93-08-00

Poland
Nowiniarska 1 ap. 1
00-235 Warsaw Poland
Phone: +48 (0) 22 635 7245
Fax: +48 (0) 22 635 7332

Russia
Ingersoll-Rand Company
Mjasnitskaya Street, 32, bld. 1
101990 Moscow
Russia
Phone: +7 (8) 095 933 03 24
Fax: +7 (8) 095 785 21 26

Scandinavia
Ingersoll-Rand
Drammensveien 126 A
0277 Oslo Norway
Phone: +47 (0) 22 55 15 26
Fax: +47 (0) 22 43 65 81

Spain
Ingersoll-Rand Productivity Solutions
Tierra de Barros, 2
28820 - Coslada
Madrid (Spain)
Phone: +34 (0) 91 6277405 / 6277400
Fax: +34 (0) 91 6277406

South Africa
Ingersoll-Rand Company SA (PTY) Ltd.
Productivity Solutions
P.O. Box 123720
Alrode 1451
South Africa
Phone: +27 (0) 11-617-3828
Fax: +27 (0) 11-864-5609

UK
Ingersoll-Rand & Co. Ltd.
Swan Lane (Gate 3)
Hindley Green
Wigan WN2 4EZ UK
Phone: +44 (0) 1942 257 171
Fax: +44 (0) 1942 503 450

USA
Ingersoll-Rand Productivity Solutions
P.O. Box 970
1467 Route 31 South
Annandale, NJ 08801
Phone: (908) 238-7000
Fax: (908) 238-7048